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RESPONSIBILITY.

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TREASURY DEPARTMENT
UNITED STATES PUBLIC HEALTH SERVICE
HUGH S. CUMMING, Surgeon General

CHILDREN'S TEETH, A COMMUNITY RESPONSIBILITY

A PRACTICAL PLAN FOR ORGANIZING PROTECTIVE AND REMEDIAL MEASURES

BY

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CHILDREN'S TEETH, A COMMUNITY RESPONSIBILITY.[1]

A Practical Plan for Organizing Protective and Remedial Measures.

By TALIAFERRO CLARK, Surgeon, and HARRY B. BUTLER, Director of Mouth Hygiene Unit No. 1, United States Public Health Service.

Introduction.

For a number of years the United States Public Health Service has been engaged in studies and investigations of the physical status of school children, and as a result of these investigations it has repeatedly drawn attention to the overwhelming preponderance of dental defects over those of all other classes.

The bad effect of decaying teeth, of inflamed gums, and of suppurating areas in the oral cavity on the health and development of young children is obvious, and no effort should be spared to prevent the occurrence of such conditions.

The provision of dental facilities, both preventive and operative, for school children, is a measure which promises to yield the most fruitful results in conserving their health.

This article has been prepared as a result of the long-felt need of this form of health supervision, and in response to the numerous requests received for information pertaining to the establishment of school dental clinics.

Investigations made by the United States Public Health Service and other agencies show that among the classes of defects observed in school children that of dental defects is not only larger than any other, but larger than all the others combined.

The examination of approximately 2,500 rural school children by United States Public Health Service officers revealed 49.3 per cent of the children with two or more decayed teeth. It is of interest to know that the percentage of decayed teeth varied with the sexes and age groups, the highest being 45.5 per cent among the 8-year-old boys and 37.5 per cent in the 7-year-old girls. Among this same group of children 18.3 per cent of the boys and 10.5 per cent of the girls stated they had never used a toothbrush, and but 13.9 per cent of the boys and 40.9 per cent of the girls stated that they used the toothbrush daily.

In a report of a recent and very extensive survey of the mouth conditions in the State by the North Carolina State Board of Health it is stated that 75 per cent of the children examined evidenced beginning decay of the teeth and less than 10 per cent of them had ever visited a dentist, and that 90 out of every 100 parents had never made any attempt to have the dental defects of their children corrected.

[1] Reprint from the Public Health Reports, vol. 35, No. 47, Nov. 19, 1920, pp. 2673–2779.

Statistics quoted relate largely to rural children. However, reports from several of the larger cities reveal a very high percentage of dental decay in the children attending school, ranging from 30 to 62.7 per cent, depending largely on the dental attention that had been given these children during the years previous to the examinations on which the statistical report was based.

In view of the lack of attention to the dental needs of the children of the land, it is not surprising that of 925,873 men who were found unfit for military duty by the first selective draft examinations, by reason of physical causes, the second highest of all causes of physical rejections was that of dental defects.

Why Teeth Decay.

Dental decay is caused by the action of bacteria, or germs, which normally inhabit the mouth. These germs, acting in the presence of food débris and certain elements in the saliva, result in the formation of an acid which attacks the enamel covering the exposed parts of a tooth, after which the underlying softer parts become rapidly destroyed. Many other factors are actual and potential causes of dental decay and its progress, such as—

1. Low resistance of the teeth to decay because of developmental defect (antenatal and postnatal).
2. Faulty diet (both of the mother during pregnancy and of the child).
3. Neglect of dental attention through ignorance of the parents.
4. The cost of dental attention, a serious consideration with families of low economic status.
5. Failure of the child to call attention to the condition of the teeth, either because it is too young or because of fear.
6. Lack of dental facilities, so common in rural sections.

Effect of Dental Decay.

It is still very little realized by most people that the teeth play a very important part in determining general health. Careful scientific investigations of recent years, however, have shown that uncorrected dental defects in children may seriously injure the growth and development of the body and greatly lower the child's resistance to communicable disease. From the standpoint of school progress carefully kept records have indicated toothache as one of the most frequent causes of absence from school and that neglected mouth conditions are responsible for a very high percentage of retardation in school work. In addition to these immediate results of dental neglect, the X-ray has pointed to diseased teeth as the starting point of many of the so-called degenerative diseases of later life the

onset of which might have been delayed or prevented by proper dental attention during childhood.

1. GROWTH AND DEVELOPMENT.

A very high percentage of undernourished children show marked evidence of dental decay. The examination of a group of 270 of this class at present under the supervision of the Public Health Service revealed 33 per cent of them with from 1 to 4 cavities, 48 per cent with from 4 to 8, and this same group showed some with 9, 10, and 11 cavities.

Young children are notoriously capricious in the choice of food, and when to this tendency there is added imperfect mastication through faulty or painful teeth, the child often refrains from eating the foods best adapted to its needs, even when such foods are offered. In addition to this, the poison absorbed from rotting teeth may seriously affect the child's nutrition and vital resistance. A clean mouth, free from sepsis, is a prerequisite for the proper growth and development of children.

2. RESISTANCE TO COMMUNICABLE DISEASES.

It is quite generally accepted that an individual falls victim to a communicable disease because of the size of the dose of the infecting agent, the virulence of the infecting organism, or an increased susceptibility which is due to lowered vital resistance. Of the many causes operating to lower resistance it is reasonable to suppose that the absorption of septic material from rotting teeth and diseased gums plays an important rôle. Conversely, it is also reasonable to suppose that a clean, healthy mouth will tend to increase the vital resistance of children and render them less susceptible to the communicable diseases. Converging evidence from many sources tends to show that bad teeth do exercise a harmful influence. In Bridgeport, Conn., where during the last five years special attention has been paid to the operation of dental clinics, reports by the city board of health indicate that there has been a very considerable reduction in the incidence of communicable diseases in that city during the period following the establishment of school dental clinics in the year 1914. During this period diphtheria showed a decrease from 26.6 per cent to 18.7 per cent, measles 20 per cent to 4.4 per cent, and scarlet fever from 14.1 per cent to 0.5 per cent.

The effect of the general application of dental measures, both preventive and operative, in the schools of Bridgeport in bringing about a reduction in the amount of communicable diseases may be questioned by reason of the fact that the incidence of the communicable diseases in the general population varies from year to year. However, the general inference of the decline in the percentage of communicable diseases in Bridgeport *pari passu* with the extension

of dental work in the schools is strengthened by a report of the improvement in the percentage of communicable diseases following the employment of a dentist and systematic dental service in St. Vincent's Orphanage, Boston, Mass. The average number of children in this institution during the period of observation was 325, and the work was in progress from April, 1912, to November, 1913. A comparative record of the health conditions for several years immediately preceding the employment of a dentist and during the period of service is quoted as follows:

Disease.	Period.						
	May, 1913, to Nov., 1913.	May, 1912, to May, 1913.	Apr., 1911, to May, 1912.	Nov., 1910, to Apr., 1911.	1909 to 1910.	1908 to 1909.	1907 to 1908.
Diphtheria	1	0	0	0	1	2	6
Mumps	0	0	0	4	10	3	8
Scarlet fever	0	0	0	8	12	8	17
Pneumonia	0	0	0	6	4	5	3
Measles	6	0	0	25	40	50	24
Tonsillitis	0	0	0	3	8	16	19
Whooping cough	0	0	0	0	2	2	7
Chicken pox	0	0	0	6	10	17	15
Typhoid	0	0	0	0	0	0	0
Croup	0	0	0	0	0	0	4
Tuberculosis, eye	0	0	1	0	0	0	0
Tuberculosis, lungs	0	0	1	0	0	0	0
Total	7	0	2	52	87	103	103

[Mouth hygiene—Fones, p. 466.]

3. PRESERVATION OF FACIAL SYMMETRY.

The preservation of the pulp (commonly referred to as the "nerve"), in the "baby teeth" is of the greatest importance. If this is not in normal condition the roots of the first set of teeth will fail to absorb, and many of the irregularities in the permanent teeth may be directly attributed to this cause. The loss of a temporary tooth before proper time also may result in the eruption of the permanent tooth to follow before thorough calcification has taken place, in which case it is more subject to decay. Very frequently little, if any, attention is paid to these temporary teeth, parents assuming that they will be replaced later by the permanent teeth and, therefore, that attention to them is unnecessary. It is rare to find a child who has not had toothache at some time. Even dentists, as a rule, pay little attention to these teeth, because young children are difficult to work for. This is unfortunate because in reality more can be done for an individual by proper attention to the first set of teeth than by repairing the ravages of decay in the permanent set after they have taken their places in regular manner.

Among 7,059 children examined during a recent investigation of mouth conditions by the Public Health Service, 1,822, or 25.81 per cent, of them were found to have lost one or more of the six-year molars. Because this tooth is the first permanent tooth to appear,

and erupting back of the last temporary tooth, it is frequently mistaken for a temporary tooth. This is nothing short of a calamity. Not only does the loss of this tooth mean the loss of masticating surface, but the tooth also determines to a considerable extent the relative positions of the other permanent teeth. Forming, in a manner, the keystone of the dental arch, with its loss this arch collapses to a greater or less degree, markedly modifying the facial symmetry of the developing child. It is important to remember that in young children the first permanent molar is the sixth tooth back counting from the center. Parents should be instructed to watch it carefully for beginning dental decay in order that steps may be taken in time for its preservation.

4. RETARDATION IN SCHOOL WORK.

From the standpoint of school progress, carefully kept records have indicated that toothache is one of the most frequent causes of absence from school. Investigations have also been made as to the relation of neglected mouth conditions to retardation in school work.[1]

In its investigation of the relation of mouth sepsis to retardation in school work, the Public Health Service has recently designed a system of giving the mouth a definite septic rating, expressing the sepsis found in terms of percentage, for use in comparison with the school rating as indicated by the marks the child attains in his regular school work. A large number of such comparisons have been made which seem to indicate that there is some relationship between an unhealthy mouth and the slow progress of the child in school work. Further investigations will be required to determine to what extent there is causal relation between an unhealthy mouth and slow progress in school.

5. DEGENERATIVE DISEASES.

The child is father to the man in more ways than one. Not only is this true from the standpoint of the acquirement of habits of thought and action during the developmental period, but also from the physical standpoint. Reference has been made to the fact that the percentage of children in need of dental attention is highest among those of 7 and 8 years of age. The neglect of the teeth in early life usually means an infected mouth with abscesses at the roots of the teeth which, unless cared for, persist in later life. It readily may be seen that such abscesses may act as reservoirs of infectious material which may enter the blood stream and be carried to the remote parts of the body, frequently causing rheumatism, heart disease, kidney trouble, and other ailments which may materially shorten life. It has been said that one-fourth of all of the people who die annually in the United States have their life shortened from 5 to 10 years by these so-called degenerative diseases.

[1] Report of five years of mouth hygiene in the public schools of Bridgeport, Conn. Alfred C. Fones, D. D. S.

Mouth Hygiene as a Branch of Preventive Medicine.

Nearly every country has awakened to the importance of mouth hygiene. In England to-day there is a movement of national magnitude well under way, which is a result of investigations conducted by a parliamentary committee. The conditions revealed by this investigation were so startling that remedial measures have been adopted with the object of benefiting all the people.

The latest governmental movement in this direction is in New Zealand. Here we find that there has been appointed a national bureau of mouth hygiene with a director and corps of assistant directors who will care for the mouths of all the school children at government expense.

In America we find that several of the States have State bureaus of mouth hygiene under the direction of their health departments. New York has established such a bureau. Among the later States to adopt the measure is Tennessee; and West Virginia has such movement well under way. Delaware will this year (1920) have a mobile clinic visiting the rural schools. Pennsylvania has a similar unit in operation under its child hygiene department, and Virginia will do a similar work in the immediate future. North Carolina has been engaged in this work for several years.

THE DENTAL HYGIENIST.

In America a forward step has been taken in dental hygiene by the training of women specialists for purely preventive work. These "dental hygienists" limit their work to the cleaning and polishing of all surfaces of the teeth above the gum margins. Experience shows that this treatment is most helpful in securing that important condition, healthy gums, and besides, prevents much dental decay. In their specialty the dental hygienists often exceed the dental man in skill and have special qualifications for handling young children.

Recognizing the special adaptation of women to this work, and the virtue of the old adage that prevention is better than cure, some 12 States have already enacted legislation legalizing the practice of dental prophylaxis by women. Among the States that have legalized this work are Maine, Massachusetts, Connecticut, New Hampshire, New York, Michigan, Minnesota, Iowa, Oklahoma, Colorado, and Tennessee. In three other States this movement is assured in the immediate future.

MOUTH HYGIENE.

Measures for conserving the teeth of children may be divided into two classes: (1) Practical, preventive, and correctional work, by the establishment of school dental clinics, and (2) education methods.

1. PREVENTIVE AND CORRECTIONAL WORK.

School dental clinics may be regarded as a valuable economic asset, as shown by results secured in a number of communities.

Mouth hygiene movements and the establishment of school clinics become an investment yielding splendid returns, especially by reducing the amount of time lost in school attendance and the number of children who repeat grades. This in itself should be sufficient recommendation of this movement even to those who are not specially interested in the health aspects of this work. Not only can the children attending school be greatly benefited by this work, but its influence extends into the home from which the child comes and furnishes a partial solution of the problem of reaching the child of preschool age.

School dental clinics may be of two types: (A) Centralized clinics and (B) Itinerant clinics.

A. CENTRALIZED CLINICS.

A centralized school dental clinic conveniently located and properly manned will, as a rule, be productive of the best results. In the establishment of these clinics the children themselves should be encouraged to furnish some portion of equipment or part of the furniture and to decorate both the clinic and waiting room. The cooperation of the junior membership of the American Red Cross will be found to be of valuable assistance for this purpose. In other instances the manual training department of the school should be encouraged to provide some of the needed furnishings. By this means the children are stimulated to take an active interest in the work of the clinic.

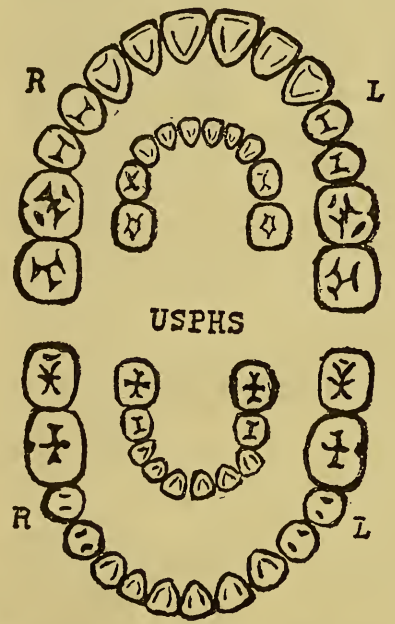
The advantage of a centralized clinic, where the school population is sufficiently large to justify the expenditure, is that it reduces not only the overhead charge, but also the expenditures for equipment. The method of operation is very simple. An inspection of the children attending the various schools is made either by the school nurse, mouth hygienist, school physician, or dentist, preferably by the school dentist. Cards are issued to the children requiring dental attention, admitting them to the clinic on a specified day at a given hour. It will be found desirable to assign a particular day of the week for the children attending the respective schools.

Great care should be observed to keep a careful record of each case, for which purpose the accompanying form is recommended.

B. ITINERANT SCHOOL DENTAL CLINICS.

The mouth hygiene needs of the smaller towns and less thickly settled rural communities can best be met by organizing itinerant school dental clinics. These should operate usually from the county seat or from one of the larger towns as a base and proceed to the outlying schools of the district where dental facilities are usually entirely absent. Preliminary to the visit of the clinic to a designated school, careful inspection should be made of the children and all

RECORD OF OPERATIONS



CODE:

A.—Amalgam
C.—Cement
S.—Synthetic
G. P.—Gutta-percha
X.—Extraction
R. T.—Root treated
R. F.—Root filled
P. R.—Pulp removed
A. L.—Abscess lanced
C. R.—Calculus removed
P.—Prophylaxis

TREASURY DEPARTMENT,
U. S. Public Health Service, Child Hygiene,
Form 5—Revised July, 1920.

YEAR OR GRADE

1	2	3	4	5	6	7	8

Number each operation with serial number 1, 2, 3, 4, etc. Outline areas filled on diagram and draw a line from them and mark with serial number and code letter (Example 1A). Enter serial number and date of operation in column representing year or grade at time of operation. Example: 1-3/3/20 entered in column 3 would indicate that on March 3, 1920, while in the third grade, pupil had operation performed. Referring to the chart we find (1A) an amalgam filling was inserted. Record for eight grades can be kept on one card.

2—10289

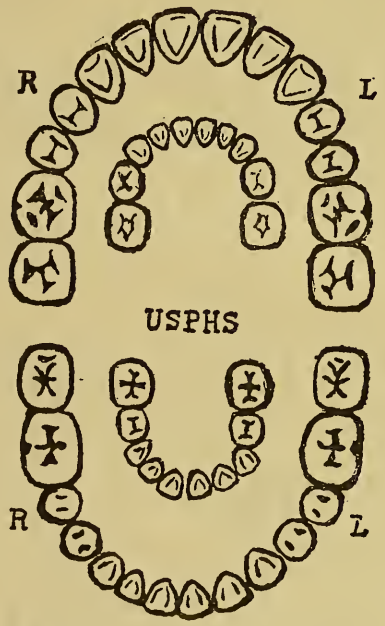
NAME _____ SCHOOL _____ GRADE _____

(FAMILY NAME) (GIVEN NAME)

COUNTY _____ PARENT OR GUARDIAN _____ MAIL ADDRESS _____

RACE: W. C. OTHER SEX: M. F.

DATE OF BIRTH: YEAR , MONTH , DAY



	1st	2d	3d	4th	5th	6th	7th	8th
Number of examination								
Date of examination								
Normal occlusion								
Malocclusion, slight								
" marked								
Ability to masticate, good								
" " " fair								
" " " poor								
Tongue, coated								
Color of gums, pink								
" " " light red								
" " " dark red								
Calculus, slight								
" extensive								
Stains, slight								
" extensive								
Use of brush, daily								
" " " occasionally								
" " " never								
Has visited dentist								
No. of cavities and roots								
No. of fillings								
No. of teeth crowned, or on bridges								

CODE: Plot carious areas on chart. Teeth missing=M. Roots remaining=R. Fistulae=F. Caries=C. Draw line from defect and indicate its character and number of examination. Example, C1 (caries, first examination).

2—10269

ORAL EXAMINATION OF SCHOOL CHILDREN

observed dental defects recorded, following which, permits should be given to the children entitling them to dental treatment at a designated place on a given day.

EQUIPMENT.

Depending on the resources of the community and the amount of dental work which it is purposed to do in the schools, the equipment of a centralized school dental clinic may be as complete as desired, including X-ray equipment and laboratory facilities.

The following is recommended as the main equipment of a mobile school dental clinic:

I. Equipment of an itinerant school dental clinic for both operative and preventive work.

Article.	Quantity.
Acid, trichloracetic, bottle	1
Alloy, copper, ounces	3
Alloy, true dental, do	6
Blowers, chip, No. 38, number	2
Blowers, chip, extra bulbs for, number	6
Bottles, medicine, ½-ounce, ground-glass stopper, number	12
Bowl, plaster, do	1
Brushes, tooth-polishing, gross	6
Burnishers, No. 30 and No. 34, number	2
Burs for straight handpiece, Nos. ½, 2, 6, 34, 35, 560, 568, 700, 702 (½ dozen each), dozen	4½
Burs for contra-angle handpiece, Nos. ½, 2, 4, 6, 33½, 35, 39, 557, 558, 560, 568, 701 (½ dozen each), dozen	6
Campho-phenol, bottle	1
Cement, Ames copper, boxes	3
Cement, S. S. W., pearl grey, do	3
Chair, portable dental, with case, number	1
Chisels, Nos. 3, 85, number	2
Clamp, rubber dam, assorted, number	6
Cotton, holder, number	1
Cotton, rolls 2, 3 (3 of each), number	6
Cotton, rolls, assorted, number	3
Composition, Modeling, boxes	6
Covers, aseptic paper, do	3
Cuspidor and stand, portable, with case, number	1
Disks, assorted, boxes	24
Engine belts, number	2
Engine, dental, all cord foot power, portable, with case, number	1
Engine oil, bottle	1
Excavators, Nos. 37, 57, 58, 63, 64, 67, 68, 81, 83, number	9
Explorers, No. 5, do	1
Eugenol, bottle	1
Floss, dental, waxed, tubes	12
Forceps, rubber dam clamp, number	1
Forceps, rubber dam punch, perfected, number	1
Forceps, tooth extracting, Nos. 150, 151, number	2
Handpiece, contra-angle, do	1
Handpiece, straight, do	1
Lamp, alcohol, with flame shield, number	1
Lancets, Nos. 2, 5, number	2
Liquid for synthetic porcelain, bottle	1
Ligature, wire, Angles, box	1
Mandrels, No. 303, dozen	1
Matrix retainer, Ivory's, number	1
Matrix retainer, extra bands for, number	24
Mercury, holder, number	1
Mercury, jugs, No. ½, do	1
Mirrors, mouth, with L handle, number	6
Morter and pestle, number	1
Napkins, aseptic, dental, boxes	3
Oil stone, Arkansas, hone	1
Paper, bibulous, package	1
Pliers, 4-inch, round-nose, flat, number	1
Pliers, dressing, Nos. 2, 17, number	2
Pluggers, Woodson, do	3
Points, carborundum, mounted, box	1
Points, orange wood, boxes	6
Porcelain, synthetic shade 6, number	1
Porcelain, synthetic shade 3, number	1
Pumice stone, powdered, pound	1
Sandurac gum, ounce	1
Scalers, McCall's, Nos. 10, 11, 12, number	3
Scalers, phyorrhea, do	4
Scissors, gum curved on flat, pair	1
Shears, 9-inch, do	1
Shears, small, plate (curved collar), pairs	1

Slab, glass, mixing, No. 6	number	1	
Spatulas, Nos. 22, 24	do	2	
Spatulas, rubber	do	2	
Sterilizer, small	do	1	
Sticks, orange wood	bundles	4	
Stopping, gutta-percha	boxes	3	
Strips, finishing, assorted	do	2	
Syringes, water	number	2	
Syringes, water, No. 21A, extra bulb for	number	1	
Trays, impression, assorted for children	number	4	
Wax, impression, yellow	boxes	2	
Wheels, corborundum, assorted, number		12	

In communities where the work will be confined to purely preventive work the following equipment will be found satisfactory:

II. Equipment of a portable school dental clinic for preventive work only.

Article.		Quantity.
Portable dental chair, with case, number		1
Portable dental cuspidor, with case, number		1
Portable dental engine, all cord, foot power, with case	number	1
Engine oil	bottle	1
Engine belt	number	2
Handpiece, contra-angle	do	1
Polishing brushes	gross	3
Scalers, pyorrhea	number	4
Mouth mirrors	do	6
Porte polisher	do	1
Wood points	boxes	6
Dappen glasses	number	3
Water syringe	do	1
Chip blowers	do	2
Pliers, dressing	do	2
Bibulous paper	package	1
Absorbent cotton	rolls	1
Sterilizer	number	1
Aseptic dental napkins	boxes	3
Campho-phenol	bottle	1
Eugenol	do	1

THE COST OF EQUIPMENT.

The cost of the equipment for a centralized clinic will vary with the amount of work it is purposed to do. However, very complete dental outfits, including a satisfactory X-ray machine, may be purchased for from $1,250 to $1,500.

The equipment recommended for an itinerant dental clinic, exclusive of an automobile for transportation, should cost approximately $250. Owing to the need of carrying this equipment in special cases designed for convenience of transportation it is not possible to purchase the complete outfit from any one dental manufacturing concern. However, persons interested in securing an outfit of this character should prepare proposals covering all the articles listed, which should be submitted to several dental manufacturing firms with the request that said firms bid on such articles as they are prepared to supply. In fact, it will be found that certain firms specialize in the manufacture of portable dental engines, others in dental cuspidors, and some others in portable dental chairs. The operative and prophylactic instruments may be purchased from any dental supply firm.

THE SCOPE OF THE WORK WHICH MAY BE UNDERTAKEN.

The amount of dental work which should be undertaken in the schools may be considered from many different angles. In some countries, as in New Zealand, all necessary dental work is undertaken; in other places the corrective work is limited to the six-year

molars; while in still other communities nothing but preventive work is considered.

Ordinarily the work should be limited to prevention and to partial correction for children under a given age, preferably 12 years. This, of course, would include the much-needed attention to the important six-year molars. No operative work should be undertaken, however, without first securing the consent of the child's parent or guardian, because in a number of instances it will be found that the parents desire to have the necessary work done by a private dentist.

Each community will necessarily have to determine the amount of corrective work which will be undertaken, and upon this determination will depend the personnel required to operate the clinic and also the equipment to be purchased.

All emergency work should, of course, be undertaken; but in the matter of fillings, it should be limited to cement, synthetic porcelain, gutta-percha, or amalgam (silver).

FEES.

Owing to the great prevalence of dental decay in children and the very common neglect of this condition in very young children, and also because of the quite general lack of dental facilities in outlying districts, school dental service should be provided at community expense as a part of the school system. Furthermore, because in every community there are a number of children suffering from dental decay, whose parents are unable to pay a fee for this work, it is undesirable that a fee system should be arranged requiring a fee for the treatment of children whose parents can pay and free treatment in the case of necessitous children. Such system assumes the aspect of charity, which should be sedulously avoided. In all instances where special and expensive fillings are desired the parents should be required to pay for the material.

In different communities where fees are charged, these range from 10 cents to $1.50 for each child. In clinics where this latter charge is made, the work is completed in all respects.

PERSONNEL.

The plan of employing a part-time operator should not be generally encouraged, because with personal interest constantly in his mind the general work of the clinic must suffer.

If a community be too small to employ a whole-time operator, a possible solution is offered in joining with some other community, each using the clinic part of the time; in which case the clinic should be of portable type and furnished with facilities for transportation.

If the clinic be small and funds for maintenance limited, a dental hygienist should be employed in preference to a dentist, for the

reason that she will not only be able largely to prevent conditions which the operator would be called upon to relieve, but she would also be able, as a result of her examinations, to notify the parents of the children of their special dental needs before these have become serious.

In the larger centralized clinics, 1 dentist should be employed for each 2,000 school children, and dental hygienists in the proportion of 2 to 4 hygienists to 1 operator. If the corrective work is to be limited, the proportion of hygienists to operators should be increased probably to 12 hygienists to 1 operator, in which case the number of children to each operator can be greatly increased.

II. EDUCATIONAL MEASURES.

Educational measures should be considered from the standpoint of the teacher, the child, the parent, and the school authorities and taxpayers.

TEACHERS.

Teachers should be given in normal school courses at least a working knowledge of mouth hygiene and of such measures as may be carried out by them without special equipment. They should be shown the value of mouth hygiene not only from the standpoint of the preservation of health, but from that of its effect on reducing absences from school and the number of children who repeat grades. In a record of causes of absences from school in the case of 1,000 school children in Valparaiso, Ind., it was found that absences amounted to a total of over 32 school years during 1 school year, and the highest percentage of causes of absences, as given by the pupils, was for toothache.

Many means are available for the instruction of teachers, such as lectures, moving picture films, and the use of instructive charts and pamphlets. Teachers should also be instructed, by practical demonstrations, in dental prophylaxis, the proper conduct of a tooth-brush drill, and the sanitary precautions which should be observed.

Special points for the consideration of the teacher.—1. Decay does not take place upon the cutting edges of the teeth or upon other surfaces which are kept polished by grinding and biting food. The reason for this is that the organisms which cause them to decay can not thrive upon polished surfaces; therefore, any surface of a tooth which can be kept polished will be free from decay.

2. Children will be unable to remove the green stains which have formed on their teeth with an ordinary toothbrush, and this should be carefully removed by a dentist or mouth hygienist and the surfaces carefully polished. The child will then be able to keep this stain from reappearing in the majority of instances.

3. The most important tooth in the mouth is the six-year molar, which appears during the sixth year, and at that time is always number six counting from the front (naturally if a first tooth has been lost, the space should be counted as though the tooth were still in position). The six-year molar comes in directly back of the last baby tooth, and there are four of them, two in each jaw. If one or more of these are lost there will not be a normal development of the jaw.

4. Dental decay and other diseased mouth conditions may lessen the child's vitality and greatly reduce his capacity for school work. Particularly is this true in cases of abscesses and inflamed gums. The normal gums are a bright pink. When they appear red at the edges or bleed upon brushing some form of inflammation exists and the child is in need of dental attention.

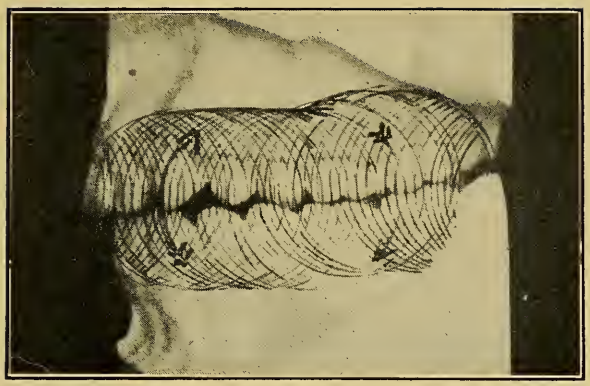
5. A child with a bad mouth is a possible menace to the health of the other children.

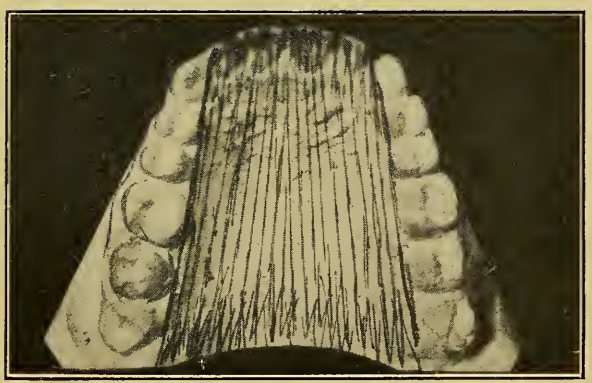
6. A dollar or an hour spent in the cause of clean mouths will give great returns in health and school efficiency.

THE PUPIL.

Many attractive ways have been devised for teaching mouth hygiene to school children. The charts and films recommended for use in the normal schools can be used for the purpose. First of all the children should be taught a proper method of making a mouth toilet. This should include the brushing of the teeth and care of the toothbrush. Little rhymes and stories will prove very useful, and many of these are to be had. Compositions prove a splendid feature and may be undertaken at intervals. Likewise, children should be encouraged to make posters illustrating some phase of mouth hygiene.

Method of brushing the teeth.—Smearing the nails with clay or vaseline and endeavoring to cleanse them with an old toothbrush will enable one to form an opinion as to the most effective method of brushing the teeth. Brushing across the nails will leave material along the sides of each nail; brushing up and down the nail will leave the area about the root of the nail uncleansed; but if the brush be used in a rotary manner, the bristles describing a small circle upon the nail, it will be found that all the material will be removed. This motion is to be recommended in brushing one's teeth upon the surface next to the lips and cheek. For the inner or tongue side the brush is used as one would use a hoe, the rotary motion being impracticable, but in using this motion the brush should not be pushed back, as this will tend to carry food débris and germs beneath the gum margins, which is the thing most to be avoided. The stroke





begins up on the gum and moves in the direction of the main axis of the tooth toward the tip or masticating surface, as shown in the accompanying cuts.

For the masticating surface a pulling and pushing motion backward and forward is recommended.

If the gums bleed when the teeth are brushed, some abnormal condition exists and a competent dentist should at once be consulted. A healthy gum is not easily injured.

A thorough rinsing of the mouth should follow to remove such material as has been dislodged by the previous processes. A number of good tooth powders and tooth pastes are on the market, and their use is not objectionable though not absolutely necessary. A very effective mouth wash is ordinary lime water, which may be diluted in reasonable degree should the taste of the stronger solution be objectionable.[1]

Toothbrush drills.—The great advantage of the toothbrush drill does not lie in the actual brushing done at the time, but in the formation of the habit and the acceptance of this procedure by the child as a part of the daily routine.

This drill is carried out in various manners; the repetition of the several strokes with the brush 12 or 16 times is the usual procedure.

Toothbrush drills should be held out of doors whenever possible. If after wetting a brush with water the thumb is run over the bristles, it will be noted that a spray flies from the brush to some distance. Care should be exercised that this spray may not reach one's neighbors during these drills, creating a condition worse than that caused by promiscuous coughing and sneezing.

The details of a toothbrush drill must be worked out according to the facilities offered—whether there be running water available or not and whether this be a single bowl or a trough with various jets, as is provided in some schools.

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[1] "It has been found that lime water is the best solvent for the gluelike accumulations of food and mucus which collect on and between the teeth where the brush can not reach. It is so much more effective than the better tasting antiseptic (socalled) mouth washes that it should be used by everyone. It is simple to make and very inexpensive.

"Buy 5 cents worth of unslaked lime at a paint store. Place a half cupful in a quart bottle and nearly fill with cold water. Shake thoroughly. After several hours, when settled, pour off as much water as possible down the sink without losing any of the lime in bottom of the bottle. This water is the washings of the lime and should not be used. Again fill the bottle with cold water, shake well, and allow to settle. This is the lime water and should be decanted into a 10 or 12 ounce bottle for use at the washbowl. The quart bottle can again be filled with cold water, shaken, and allowed to settle for future use. This operation may be repeated as long as there is any lime left in the bottle.

"Use the wash without diluting. Thoroughly rinse until it foams in the mouth, then rinse the mouth with warm water.

"Use after each meal.

—Alfred C. Fones, D. D. S., Bridgeport, Conn."

Toothbrushes should not be kept in the schools, but should be brought from the home carefully wrapped, preferably in oiled paper.

Care of the toothbrush.—After using the brush it should be carefully rinsed and placed apart from others where it may become dried out. It should not be kept in water or any solution, but should be placed when possible where it may receive the direct sun rays for a time. Not only is sunlight nature's destroyer of germs, but the life of the brush will be materially lengthened by this means.

A small toothbrush with comparatively few bristles should be used. The larger sizes are inefficient, and if the brush be too closely bristled, the bristles will not reach the spaces between the teeth.

Use of the toothpick and dental floss.—The use of the toothpick is to be condemned. It is most desirable to preserve those portions of the gums which lie between the teeth, and the use of a toothpick is most injurious to this tissue.

In the improper use of the dental floss much damage is often done. If the floss be held tightly between the fingers and forced through between the teeth, a heavy blow is delivered directly upon this tissue, the floss usually following the neck of one tooth and separating the gum from the tooth at this point, with an eventual recession of the gum following. Floss should be drawn carefully and gently between the teeth with a pulling motion. Thus used, the point where the teeth are in contact with each other and which can not be thoroughly cleansed with the brush are successfully reached.

EDUCATION OF PARENTS AND GUARDIANS.

In order that the community may reap the maximum return from expenditures incurred in operating school dental clinics the work in the schools should be accompanied by follow-up work in the homes to impress upon the responsible heads of families the importance of mouth hygiene from the standpoint of the growth and development of their children and the necessity of securing dental attention for children of preschool age. If the cooperation of the parents is thus secured, many children will enter school in better physical condition and without the necessity of losing time from school by reason of unsound and aching teeth. In fact, without the active cooperation of the parents the greatest benefit will not accrue to children who receive attention in the school, because of the necessity of home supervision to insure that they carry out and put into practice the teachings received in the school.

Diet.—It must be remembered that the diet plays an important part in determining whether or not the child is to have sound teeth or teeth that are poorly resistant to decay. This even extends back to the period before the child is born. Expectant mothers should be

taught to include in their dietary foods rich in phosphorous and lime, such as most fresh fruits and the green vegetables.

Furthermore, the effect of the absence of certain accessory food factors in causing scurvy and rickets (conditions that are invariably associated with bad teeth) makes it highly important that the children of preschool age, and older children as well, be required to eat each day articles of food that are rich in antiscorbutic and antirachitic substances, such as fresh fruits, green vegetables, and butter, and encouraged to drink an abundance of milk. The too free consumption of sweets should be discouraged.

SCHOOL AUTHORITIES AND TAXPAYERS.

Mouth hygiene is a business proposition. Regardless of one's means of getting a living, we are all in the business of educating our children. To manage this business we employ a superintendent, but in no other business, as is so often the case in this, would we allow our interests to cease with his employment.

The per capita cost of educating a child is obtained by dividing the total school budget by the number of children in attendance. If a child fails to make grade, the situation is exactly the same as though a manufacturer found that after passing through the plant an article was defective and unsalable. Furthermore, if it was found that a large proportion of the products of the plant were unmarketable, would not immediate steps be taken to remedy the condition? The establishment of school dental clinics and the teaching of mouth hygiene is one of the important remedial steps which should be taken in the school plants. A reduction in the percentage of retarded children not only means fewer school buildings and reduced overhead charge, but also makes possible the employment of better teachers. As a matter of dollars and cents, mouth hygiene offers splendid returns for each dollar expended in the better growth and development of the children and by assuring better physical types.

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